

**PLANT PROTECTION TECHNOLOGY OF APPLE**

**PESTS**

Name of the pests		Country	Monitoring methods	Control measures		
English	Latin			Cultural and mechanical	Beneficial organisms	Other substances
Cockchafer	<i>Melolontha spp.</i>	Hungary	visual checking, estimation of number in the soil by digging	-	only research stadium: application of <i>Steinernema spp.</i> and <i>Heterorhabditis spp.</i>	-
		Poland	visual checking, estimation of number in the soil by digging	-	application of <i>Heterorhabditis spp.</i> In the research stadium - <i>Beauveria bassiana</i>	-
Aphids	<i>Aphididae</i>	Austria	-	not exaggerate with nitrogen nutrition, cultivating flowering plants in the orchard, support of beneficial arthropods	-	Neem, potassium soap
		Cyprus	visual checking	support of beneficial arthropods	-	soap solution
		Poland	yellow trap, suction trap, visual checking	support of beneficial organisms	-	oils, potassium soap
		Slovenia	Sticky traps	-	-	Plant and paraffin oils, Neem
		Hungary	yellow trap, visual checking	cleaning of trees	-	oils, potassium soap

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Codling moth	Cydia (Laspeyresia) pomonella	Austria	pheromone traps, checking of oviposition, tent shaped isolators, visual observation	confuse technique support of birds	virus-products (Granulosevirus: Carpovirusine, Madex3),	pheromone traps (RAK 3 Pheromon)
		Bulgaria	Pheromone trap	-	support of natural enemy e.g.: <i>Ascogaster quidridentata</i>	-
		Cyprus	traps	pheromone	<i>Bacillus thuringiensis</i>	spraying with spec. soap solution
		Czech Republic	sex pheromone traps, visual checking of eggs on leaves and fruits), weather monitoring methods (SET- °C)	attraction and collection using sex pheromone traps (including mating disruption method); bulking paper belt around the trunk (winter sites for C. pomonella larvae)	Entomoparasitic nematodes <i>Steinernema carpocapsae</i> – application of nematodes on trunk behind paper belts; Egg parasitoids – <i>Trichogramma sp.</i> , Granulosis virus GvCp (both on experimental level only)	-
		Estonia	visual checking, pheromone traps	cleaning of trunks	-	-

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Codling moth	Cydia (Laspeyresia) pomonella	Hungary	sex-pheromone trap, visual assessment of eggs	support of beneficial organisms, removal of dropped infested fruit, placing out balking paper belt before pupation to provide artificial pupation sites	<i>Bacillus thuringiensis</i> - <i>var. kurstaki</i>	oils, pyrethrin Neem
		Lithuania	Traps at BBCH 67-69	-	-	-
		Poland	pheromone traps visual assessment of eggs	Support of natural enemies, removal of dropped infested fruits, placing out balking paper belt to provide, artificial pupation sites before pupation	support of birds <i>Bacillus thuringiensis</i> - <i>Baculovirus</i> –Madex, <i>Carpovirusine</i> , <i>Trichogramma cacoecia</i>	grey soap Pyrethrum
		Slovakia	pheromone traps	-	<i>Bacillus thuringiensis</i> <i>var. kurstaki</i>	-
		Slovenia	pheromone traps	mating disruption	Granulose viruses, <i>Bacillus thurginensis</i>	-
Apple moth	<i>Argyresthia conjugella</i>	Estonia	visual checking	cleaning of trunks, tillage	-	-

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Mediterranean fruit fly	<i>Ceratitis capitata</i>	Cyprus	yellow traps	traps, bait sprays, support of natural enemies e.g. <i>Opius spp.</i>	-	spraying with spec. soap liquid
Apple sawfly	<i>Hoplocampa testudinea</i>	Austria	white sticky traps	-	support of birds	Quassia
		Germany	visual checking	-	-	Quassia
		Lithuania	checking of fruit germ	-	-	-
		Slovenia	white sticky traps	white sticky traps	-	-

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European red mite	<i>Panonychus ulmi</i>	Cyprus	visual checking	support of beneficial organisms e.g. <i>Phytoseilius spp</i>	-	oils
		Czech Republic	winter visual control of branches (eggs)	-	Predatory mite <i>Typhlodromus pyri</i>	-
		Hungary	visual checking of population on leaves, checking of overwintering eggs on branches	support of beneficial organisms, cleaning of trees	-	potassium soap, oils
		Poland	visual checking	-	-	Pyrethrum, oils
California scale	<i>Quadraspidiotus perniciosus</i>	Hungary	visual checking of branches, colour sticky traps	scale free propagation material cleaning the bark from infestation, cutting the heavily infested parts of the trees, support of beneficial organisms	-	oils, sulphur
Spider mite	<i>Teranychus s.p</i>	Cyprus	visual checking	support of beneficial organisms, e.g. <i>Phytoseilius spp.</i>	-	sulphur, spec. soap solution
Rust mite	<i>Aculus schlechtendali</i>	Germany	visual checking	enhancing natural enemies of pests e.g.: promote habitats for <i>Typhlodromus pyri</i>	-	sulphur

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Apple weevil	<i>Anthonomus pomorum</i>	Austria	checking by knocking	-	-	Pyrethrum
		Estonia	visual checking	cleaning of trunks, tillage	-	-
		Poland	visual checking	Placing straw belt around the trunk	-	Pyrethrum
Flatheaded appletree borer	<i>Chryso-bothris femorata</i>	Latvia	-	pheromone traps	-	-
Water vole	<i>Arvicola terrestris</i>	Germany	visual, traps	traps, mechanical migration barrier	-	fumigation
	<i>Agryresthia conjugella</i>	Estonia	visual checking	cleaning of trunks, tillage	-	-

**DISEASES**

Name of the diseases		Country	Monitoring methods	Control measures		
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Fire blight	<i>Erwinia amylovora</i>	Austria	-	choice of location and cultivars, aeration, reduced fertilization, remove infested sprouts	antagonist (yeast, bacteria)	clay compounds
		Germany	visual checking	resistant varieties, cutting and burning infected material, cutting tools well cleaned	-	clay and plant extracts for plant strengthener, copper products with permission
		Hungary	Maryblight monitoring program	resistant and tolerant varieties, pruning and eradication of infected plant parts, the disinfection of tools (pruning shears)	-	copper, plant strengtheners -Biokali, rhyolite tufa melioration, bacterium manuring with Phylazonit
		Poland	Maryblight monitoring program	resistant and tolerant varieties; pruning and eradication of infected plant parts; disinfection of pruning tools	-	copper

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Apple scab	<i>Venturia inaequalis</i>	Austria	forecasting models, simulation-models, weather-monitoring	choice of location, aeration, balanced fertilization	-	copper-solutions, sulphur-lime-solution
		Czech Republic	weather forecasting	resistant cultivars, sanitation and cleaning of apple leaves	-	-
		Estonia	visual checking	resistant varieties, sparse plantation, sparse branches, removal of fallen leaves	-	-
		Germany	visual checking	resistant varieties	-	copper with permission, sulphur
		Hungary	checking of the dispersion of infectious spores on the over wintering leaves, weather monitoring	resistant and tolerant varieties, destroying dropped leaves by tillage or removal	-	copper, plant strengtheners -Biokali, rhyolite tufa melioration, bacterium manuring with Phylazonit
		Lithuania	visual checking using forecasting system according to weather data	resistant varieties	-	-



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Apple scab	<i>Venturia inaequalis</i>	Poland	checking of the dispersion of infectious spores on the over-wintering leaves weather monitoring	resistant and tolerant varieties, destroy of dropped leaves by tillage or removal	-	copper
		Slovenia	spore traps	-	-	copper, algae preparation, Mycosin-herbal extract and acid clay
Powdery mildew	<i>Podosphaera leucotricha</i>	Austria		choice of location and cultivars, aeration, reduced fertilization, remove infested sprouts	-	sulphur and lime sulphur
		Germany	visual			sulphur, lecithin
		Hungary	weather monitoring visual checking	resistant and tolerant varieties, pruning infected shoots in spring and winter		sulphur, oils, , plant strengtheners-Biokali, rhyolite tufa melioration, bacterium manuring with Phylazonit
		Poland	weather monitoring visual checking	resistant and tolerant varieties; Pruning infected shoots in spring and winter	-	Sulphur, oils

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Brown rot	<i>Monilinia fructigena</i>	Estonia	visual checking	sparse branches, removal of infested fruits	-	-
		Hungary	weather monitoring	sanitation practices, pruning and removal of infected twigs and mummified fruit	-	sulphur, plant strengtheners-Biokal, rhyolite tufa, melioration, bacterium manuring with Phylazonit
		Lithuania	visual method	trees density, resistant varieties	-	-
		Poland	weather monitoring	sanitation practices :pruning and removal of infected twigs and mummified fruits	-	sulphur , copper
Apple cancer	<i>Nectria galligena</i>	Lithuania	visual assessment end of vegetation 1 time / 2 years	resistant varieties	-	-
Storage disease	<i>Gloeodes pomigena etc.</i>	Austria	-	choice of cultivar, dipping fruits into hot water	-	copper, lime sulphur